The theory of the parasitic nature of the affection need be mentioned merely to be disposed of as being entirely out of the question. No sign of any vegetable organism was found within the hair or in any of the epithelial cells of the epidermis or follicle. The microscopic examinations were conducted with much care, a large number of hairs, together with epithelial matter taken from the follicles and epidermis, having been viewed under both low and high powers. The specimens were obtained and examined on several occasions, and at intervals of months, with invariably the same result.

Splitting of the hair taking place without the follicle is by no means a rare condition, and may exist in all degrees of severity. It occurs in the long fine hairs of the scalp, and also less frequently in the shorter hairs of the beard. A case of simple splitting of the hair of the beard occurring in a gentleman of thirty with reddish hair, is at the present time under my observation. The hairs, upon being allowed to grow to any length, become dry and brittle, and split up at their free extremities into two or more parts, giving the beard a somewhat curly, bushy appearance.

In conclusion, it may be remarked that the disease which is the subject of this communication must be regarded as one of atrophy of the hair, and may be grouped with that singular and rare disease which was first described by Beigel under the name of "swelling and bursting of the hairs" (*Sitzb. d. k. Akad. d. W.* bd. xvii. p. 612, 1855). Kaposi, who has also met with the disease of Beigel, just referred to, proposes for it the name "trichorexis nodosa" (Hebra and Kaposi, *Diseases of the Skin*, New Syd. Soc. Trans., vol. iii. p. 244). The affection described by Devergie, and called by him "tricoptilosis" (*Annales de Derm. et de Syph.* No. i. 1871, 1872), is doubtless the same disease as the "swelling and bursting of the hairs" of Beigel. It differs in many particulars from the disease under consideration.

ARTICLE VII.

A GUNSHOT WOUND OF THE FACE, TOGETHER WITH THE DESCRIPTION OF A SPLINT ADAPTED FOR COMPOUND FRACTURES OF THE UPPER JAW.

By W. F. MUHLENBERG, M.D., of Reading, Pa.

DURING the railroad riot that took place in Reading on July 23, 1877, E. H., aged 23, was shot through both cheeks, whilst slightly under the influence of liquor.

The hemorrhage, quite profuse at first, soon stopped after the patient had passed into a state of partial syncope. No large arteries were apparently injured, and by the next day the venous oozing had entirely ceased. The ball, probably a large sized minie, entered the right cheek at the intersection of a line, extending three inches horizontally from the ear, with another $2\frac{1}{2}$ inches long, drawn perpendicular to the outer edge of the superciliary ridge. Its course, after passing through the anterior portion of the right malar bone, was directly through the face, and then out on the opposite side, at an almost identical position.

The damage to the bones of the face was excessive, and the face, to use the language of one of the physicians who saw it, "was nothing but a bag of bones." Every bone, except the inferior maxilla, was fractured, either in a simple or comminuted manner. The ethmoid, and probably the sphenoid, were also broken. Both superior maxillæ, detached completely from any bony union, protruded at least an inch in front of their normal position, and fell, over an inch, almost to the level of the chin, while the upper teeth protruded and projected far beyond and below the lower. The fracture, directly across the face, separated the orbital portions of both superior maxillæ from the bodies of the bones. A fracture in the roof of the mouth followed very closely the line of union, between the superior maxillary and palate bones, extending immediately in front of the second upper molar of the right side, through the roof of the mouth and floor of the nasal cavity, to a point before the last upper molar of the left side.

There was also an antero-posterior fracture in the roof of the mouth, completely separating both superior maxillæ. In addition, in the roof of the mouth there were a number of incomplete fractures and fissures.

The gap in the cheeks between the dislodged and orbital portions of both superior maxillæ was fully an inch wide, and disclosed, on palpation and probing, numerous fragments and spicula of bone. The space in the mouth between the palate and superior maxillary bones was large enough to admit the little finger. Both nasal bones were comminuted. The vomer was fractured, and quite a large portion was driven, by the force of the ball, through the cheek, and extracted, on the following day, at about the normal position of the left malar bone. The turbinated bones were also broken extensively.

Besides, the orbital portion of the superior maxilla of the left side was dislodged, and on the following day, after the removal of some impacted fragments of bones in the cheek, the entire anterior portion of the floor of the left orbit, together with the eye, sank down half an inch, although subsequently the level of the eye was raised to almost its normal position by the great effusion that resulted. The ethmoid bone was fractured, as was shown by the inspection of fragments subsequently removed. The lachrymal bone of the left side was dislodged, and forced down into the nasal cavity. The right malar bone was only slightly injured, while very little remained of the left malar bone, except its orbital portion. The inferior maxilla was not at all injured.

The face of the patient, subsequent to the injury, was more canine than human, as evidenced by the sinking in of the bridge of the nose, the protrusion and dependency of the upper lip and adjacent portion of the cheek, and the relative retraction of the chin and lower portion of the face.

The wound of entrance was about the size of the ball that produced it, while the wound of exit extended from the base of the left nostril and inner canthus of the left eye, in a Y shape, near to the left temple.

The different bones and fragments of bones lodged between the upper and lower portions of the superior maxillæ were firmly impacted, and required considerable force and time to remove them. Although, after their removal, the lower portion of the upper jaw hung apparently by only a very slight muscular adhesion, and allowed all necessary examinations, still after effusion took place, any examination of the mouth became difficult, and finally almost impossible.

The great difficulty which presented itself was, how to feed the patient. It was impossible for him to masticate any food, or even to draw liquid nourishment through a tube, not only because the mouth and nose were almost as one cavity, communicating freely with each other and the outside air, but also because any muscular action of the cheeks necessary for such an operation was prevented by their loss of power, and by the utter inability to keep the lips closed. He was fed by inserting a small gum tube into a tumblerful of liquid food, raised above the level of his mouth, starting a siphonic flow, and then insinuating the end of the tube between the two jaws, and allowing the fluid to trickle down his throat. This was comparatively easy for a short time, as the upper jaw could readily be raised a very short distance, so as to allow the tube to be inserted, but after the swelling and effusion had taken place was very difficult, as the tube had to be pushed upwards and then backwards before it could enter the cavity of the mouth, owing to the advanced and dependent position of the upper jaw, and its almost total immobility. However, this method of feeding was continued for six weeks, until, by the use of the splint, the upper jaw could again be raised. The patient suffered considerable pain from the passage of liquids, like brandy, beef tea, etc., over the raw surfaces of the mouth; but notwithstanding the discomfort, submitted patiently to all these annoyances.

The treatment used was the general one. The external wounds were covered with linen cloths, which were removed every fifteen minutes, night and day. These rags were dipped in ice-water, holding in solution, carbolic acid, laudanum, and lead-water. This mode of external treatment was continued for four days, when hot flaxseed poultices, renewed every half hour, were substituted for it, owing to the flabby and lifeless appearance of the wound. On consultation with a number of physicians of Reading, it was considered impossible to save the upper jaw, and its resection from the slight muscular attachments was agreed upon. Indeed, all the physicians who saw the patient gave an unfavourable prognosis as to the termination of the case.

However, on the morning fixed for the operation, the seventh day after the injury, the condition of the patient was entirely too precarious to admit or justify any operation, and then it was agreed to allow the reparative powers of nature full scope, and remove the sequestra of bone as they became loosened. On this day the patient was sinking very rapidly, but soon rallied, after a decided increase in the amount of stimulants and food given him. Unfortunately this low condition of the patient hindered us from securing his photograph, as for several weeks his wound was considered necessarily fatal by every physician who saw him. The patient during the first week consumed, besides the food he took, xij ounces of brandy per diem, but after this period used every day xx ounces of brandy, 3 quarts of milk, half a jar of Valentin's meat extract, a pint of beef-tea, and 3 or 4 eggs. About 1 grain of morphia sulphate was administered during the course of 24 hours, and a solution of the phosphates of iron, quinia, and strychnia was given from the time of the injury.

The splint shown in the drawing on page 97 was not applied until two weeks after the wound had been received, owing to the difficulty of devising any apparatus of the kind, and the time required in its manufacture. The kind assistance of Dr. T. Yardley Brown, a dentist of this city, and Mr. Van Reed, his student, not only in inventing the apparatus, but in its entire manufacture, made the splint feasible. The measurements for the splint were made by Dr. Brown with a great deal of difficulty, as an ordinary pair of dividers could hardly be pushed in the mouth, and of course no wax model was practicable.

Within two weeks after the wound was received, the wound of entrance had closed, but in the subsequent week again broke open and discharged some spicula of bone.

The discharge of pus from the nose, mouth, and external wounds was excessive, and interfered to a certain extent with the feeding of the patient. He was forced to lie and sleep with his head thrown far forward, and to assume almost a sitting posture in bed, to prevent the pus and fragments of bone, discharged into the mouth, from running or falling down his throat.

Salicylic acid was applied topically to the mouth and external wound, to act as a disinfectant and correct the fetor. In the mouth it caused considerable irritation with desquamation of the epithelium, and on this account a solution of chlorinated soda was substituted for it. A solution of boracic or carbolic acid was daily used to cleanse the wounds during the entire sickness. The mouth was syringed at least every hour during the day, and almost as frequently at night, for the mixture of pus, saliva and food formed quite concrete masses which would not flow out. After the wound of entrance had again broken open, warm carbolated water was injected through it into the face, at least three times a day. The injected fluid ran out of both nostrils, the mouth, and the external wound on the opposite side of the face. A large sinus at the inner canthus of the left eye was also used for injection, and through it large quantities of pus were discharged by the nose and mouth. A probe inserted at this opening fell by its own weight as far as the roof, and occasionally to the floor of the mouth, while it required only the slightest effort to pass a probe from the right cheek to the left nostril.

This plan of treatment was continued for two months, the dead pieces of bone being removed as fast as they appeared, when the patient was at last freed from any discharge of pieces of bone, or symptoms of osseous inflammation. Forty different pieces of bone, each larger than a pea, were removed from the face, nose, and mouth before convalescence was completed, and one piece of lead about as large as a buckshot was pried out of the left nostril. The effusion in the lids of the left eye and in the eye itself was excessive, but the œdema was readily lessened by an inverted action of the hypodermic syringe. A lump of œdematous flesh, as large as a walnut, was present under the same eye for nearly six months.

Within two months the upper jaw had been gradually forced up to its normal position, but owing to the extreme loss of bone, had been pressed back into the mouth further than was necessary. Unfortunately the adjustment of straps to the splint made it an easy matter for the nurses to alter the tension of the different straps if the patient complained of pain on one side of the face or the other.

From the time of the adjustment of the splint (August) to the latter end of November, the patient wore it continuously, and hardly ever objected to its presence in his mouth. The teeth of the upper jaw presented an irregular position, which perhaps might have been originally obviated if the adjustment of the straps of the splint had not been interfered with by the nurses. In November all the wounds had closed, except a small communication in the mouth immediately behind the incisors, between the nose and mouth, which gave rise to considerable annoyance, as the food readily collected there.

Since the middle of December the patient has been wearing an elegant apparatus, contrived by Dr. T. Y. Brown, to remedy the false position of his upper teeth. Unfortunately the patient still continues wearing it, and as I have not seen him for a month, cannot secure a drawing of it. It is made of a silver plate, accurately moulded to the upper jaw, and retained in its position by a clamp around the last molar. A lever, in front of the same tooth, working in a joint, and having its upper end attached by a gum cord to the same tooth, presses forcibly upon the inner side of the last bicuspid, and gradually throws it out. A gum cord, fastened around the canine tooth of the right side, pulls it back, as the cord is attached to a small lever in the back part of the plate. Since the adaptation of this splint the position of the teeth has become nearly normal, and at some future day we may give an account of the amended mouth and splint.

Since the beginning of this year the patient has been able to use his upper jaw nearly as well as before the injury, although the union is not perfect. He can eat and chew any kind of food. The communication between the mouth and nose has entirely closed. The right side of the face is very slightly disfigured, and even the entire absence of the orbital portion of the superior maxilla of this side, which was removed piecemeal, is hardly noticeable. The hollow along the edge of the lower lid is not marked, still the removal of this bone has given rise to an epicanthus of the inner angle of the eye. There are a good many scars on the left side of the face, and vision is totally lost in the left eye.

With the exception that the lachrymal bone has been removed, the floor of the left orbit is entire; still it is all depressed some distance below its normal level.

The nose is considerably flattened, and pervious only on the one side. Vision in the right eye, hindered at first by the epicanthus, is now nearly as good as before the accident.

During the entire period of sickness there were no symptoms of any erysipelatous or pyæmic troubles.

Injuries of this kind are so rare that scarcely any allusion is made to them in the text-books.

The inferences we have drawn have been the following:—

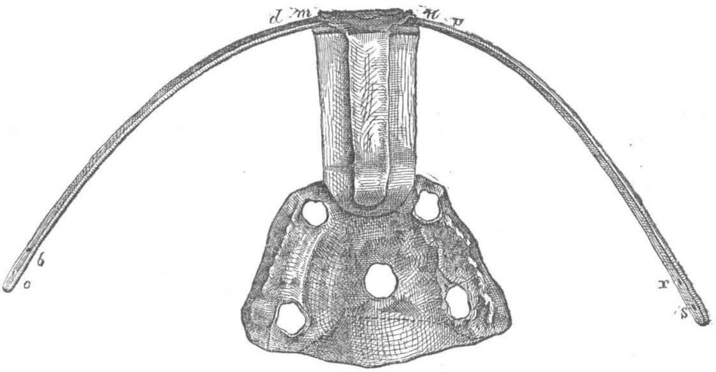
No matter how severe the injury of the upper part of the face, owing to the excessive vascularity of the part, the reparative powers of nature are very decided, and the removal of any apparently sound pieces of bone seems unjustifiable. Good nursing is a *sine qua non.*

The subsequent union will probably be osseous.

The danger from erysipelas can be readily guarded against. Great attention must be paid to cleanliness, and antiseptics cannot be dispensed with.

The surgery of these parts of the body must be conservative, and must be varied according to the exigencies of each case.

The wood-cut of the splint represents a full view from behind. The cup-shaped body of this splint is made of silver, while the outer band is of brass, and firmly welded to it by hard solder, so that the entire splint is and acts as a solid body. The splint on being applied acts as a rest for the teeth, which are prevented from being pressed out by the rim. The adjustment of the splint is easy. The patient should wear a night-cap made of some stout material. At *b o* and *r s* are firmly fastened gum bands which pass directly behind the head; at the same places, which are immediately in front of the ear, similar bands are attached, which run up over the temples, and at *d m* and *n p* gum bands are joined, which lead up on each side of the nose and pass to the front part of the head.



After the body of the splint is introduced into the mouth, presupposing a comminuted or bad fracture of the upper jaw, and after the readjustment of the fragments, the bands at *b o* and *r s*, which run behind the head, are tightened and pulled back, and of course draw back the entire splint and upper jaw, if there has been any anterior displacement of it. The bands running over the temples are then pinned or sewed fast to the night-cap, and elevate the posterior part of the band of the splint, which is outside the mouth, and naturally the posterior part of the body of the splint in the patient's mouth, as the splint is supposed to be one solid body. The bands running over the face, on each side of the nose, when fastened, serve to raise the anterior part of the splint. With these six straps we can then produce any effect we please, and can raise or loosen a single one, or a pair of straps, according to circumstances. The combined effect of them is to raise and retract the upper jaw, and this is very readily effected. By using the elastic straps, change in the tension can be readily made, and besides, the elastic nature of the India-rubber serves steadily to produce the effect desired. The great objection to this splint is the ease with which these straps can be tightened or loosened at the desire of the patient.